

## CLAIMS

Sub B'  
1. 7

1. A method of remotely maintaining a client computer having attributes and a local operating system, the method comprising the steps of:

5           contacting a server computer prior to loading said local operating system  
            to obtain management instructions; and  
            selecting management instructions for said client computer at said server  
            computer, wherein said management instructions are based upon  
            said attributes of said client computer;  
10           providing said management instructions from said server computer to said  
            client computer; and  
            executing said management instructions at said client computer.

2. The method of claim 1, wherein said step of selecting management instructions  
comprises:

            determining said attributes of said client computer;  
            providing said attributes to said server computer; and  
            selecting said management instructions in response to at least one of said  
            attributes.

3. The method of claim 3 wherein said attributes comprise hardware attributes.

4. The method of claim 3 wherein said attributes comprise firmware attributes.

Sub B<sup>1</sup>7

5. The method of claim 3 wherein said attributes comprise desktop management interface (DMI) attributes.
6. The method of claim 3 wherein said attributes comprise PCI attributes.
7. The method of claim 3 wherein said attributes comprise SMBIOS attributes.
8. The method of claim 3 wherein said attributes comprise at least one of the group consisting of system manufacturer, model, motherboard type, bus information, and adapter information.
9. The method of claim 6 wherein said adapter information comprises information about adapter orientation within a system bus of said client computer.
10. The method of claim 1 wherein said client computer comprises a file system and wherein said step of executing said management instructions comprises verifying said file system of said client computer.
11. The method of claim 10 wherein said step of verifying said file system comprises checking the files in said file system against an index file.

- Sub B<sup>1</sup> 7
12. The method of claim 11 wherein said index file is retained on said server computer and wherein said step of verifying said file system is executed on said server computer.
  13. The method of claim 11 wherein said index file is retained on said client computer and wherein said step of verifying said file system is executed on said client computer.
  14. The method of claim 11 wherein said index file is compressed.
  15. The method of claim 11 wherein files missing from said file system are retrieved from said server computer.
  16. The method of claim 11 wherein said index file corresponds to said attributes of said client computer.
  17. The method of claim 15 wherein said files are accessed using the PXE protocol.
  18. The method of claim 1 wherein said contacting step is substantially in accordance with the PXE protocol.
  19. The method of claim 1 further comprising the step of mounting a remote drive from said server computer to said client computer.

Sub B<sup>1</sup> 7

20. The method of claim 19 wherein said step of executing said management instructions comprises accessing data files on said remote drive.
21. The method of claim 1 wherein said client computer comprises a registry file and wherein said step of managing the interaction of said server computer and said client computer comprises verifying said registry file of said client computer.
22. The method of claim 19 wherein said step of verifying said registry file comprises checking entries in said registry file against a registry index file.
23. The method of claim 19 wherein said registry index file is retained on said server computer and wherein said step of verifying said registry file is executed on said server computer.
24. The method of claim 21 wherein said registry index file is retained on said client computer and wherein said step of verifying said registry file is executed on said client computer.
25. The method of claim 21 wherein said registry index file corresponds to said attributes of said client computer.

Sub B' 7  
26

A computer readable medium having stored thereon a plurality of data structures, said data structures comprising a plurality of workstation objects, each of said workstation objects corresponding to one of a plurality of workstations, wherein each of said plurality of workstation objects comprises a plurality of data structures representing attributes of said one of said plurality of workstations, and wherein each of said workstation objects is associated with at least one of a plurality of template objects, wherein each of said plurality of template objects is associated with one of a plurality of event objects, wherein each of said plurality of event objects is associated with one of a plurality of script objects, and wherein each of said script objects comprises instructions to be executed by one of said plurality of workstations as part of a pre-boot sequence.

27. The computer readable medium of claim 26 further comprising at least one workstation group object representing a workstation group corresponding to said plurality of workstations.
28. The computer readable medium of claim 26 wherein at least one of said template objects is associated with at least one workstation group object such that each of said plurality of workstations becomes associated with said at least one of said template objects via said at least one workstation group object.

Sub B 7

29. The computer readable medium of claim 26 wherein said at least one of said template objects is associated with at least one workstation object as a function of said attributes of said at least one workstation object.

30. The method of claim 29 wherein said attributes comprise hardware attributes.

31. The method of claim 29 wherein said attributes comprise firmware attributes.

32. The method of claim 29 wherein said attributes comprise desktop management interface (DMI) attributes.

33. The method of claim 29 wherein said attributes are PCI attributes.

34. The method of claim 29 wherein said attributes are SMBIOS attributes.

35. The method of claim 29 wherein said attributes comprise at least one of the group consisting of system manufacturer, model, motherboard type, bus information, and adapter information.

36. The method of claim 35 wherein said adapter information comprises information about adapter orientation within a system bus of said client computer.

Sub B'7

37. The computer readable medium of claim 30 wherein said instructions comprise scripts executed by one of said plurality of workstations.

38. The computer readable medium of claim 37 wherein said scripts are REXX scripts.

39. The computer readable medium of claim 37 wherein said scripts are PERL scripts.

40. The computer readable medium of claim 37 wherein said scripts are batch scripts.

41. The computer readable medium of claim 37 wherein each of said workstation objects are directory services objects.

42. A method of remotely managing a client computer comprising the steps of:  
providing a boot configuration program from a server in response to a  
request from said client computer, said boot configuration program  
being configured to identify attributes of said client computer and to  
provide said attributes to said server;  
receiving said attributes from said client computer at said server;  
selecting management instructions at said server in response to said  
attributes; and

Sub B 7  
10

providing said management instructions from said server to said client computer.

43. The method of claim 42 wherein said attributes comprise hardware attributes.
44. The method of claim 43 wherein said attributes comprise firmware attributes.
45. The method of claim 38 further comprising the step of executing said management instructions at said client computer.
46. The method of claim 45 wherein said management instructions comprise at least one of a plurality of scripts.
47. The method of claim 46 wherein at least one of said plurality of scripts is a REXX script.
48. The method of claim 46 wherein at least one of said plurality of scripts is a PERL script.
49. The method of claim 46 wherein at least one of said plurality of scripts is a batch script.



Sub B<sup>7</sup>

50. The method of claim 46 wherein each of said plurality of scripts is associated with a workstation object at said server, wherein said workstation object is associated with said client computer.
51. The method of claim 46 wherein each script comprises instructions for executing one or more tasks in response to the occurrence of at least one event.
52. The method of claim 51 wherein at least one of said templates is associated with said script at said server through an event object.
53. The method of claim 51 wherein at least one of said templates is associated with said script at said server via a workstation group object.
54. The method of claim 51 wherein at least one of said templates is associated with said script at said server via said attributes of said client computer.
55. The method of claim 54 wherein said attributes comprise hardware attributes.
56. The method of claim 55 wherein said attributes comprise at least one of the group consisting of manufacturer, model, motherboard type, bus information and adapter information.
57. The method of claim 55 wherein said attributes comprise PCI attributes.

Sub B 7

58. The method of claim 55 wherein said attributes are DMI attributes.
59. The method of claim 55 wherein said attributes are SMBIOS attributes.
60. The method of claim 54 wherein said providing step and said receiving step are substantially in accordance with the PXE protocol.
61. The method of claim 56 wherein said providing step and said receiving step are substantially in accordance with the PXE protocol.
62. The method of claim 42 wherein said client computer comprises a file system and wherein said step of managing said client computer comprises verifying said file system of said client computer.
63. The method of claim 62 wherein said step of verifying said file system comprises checking the files in said file system against an index file.
64. The method of claim 63 wherein said index file is retained on said server computer and wherein said step of verifying said file system is executed on said server computer.

Sub B'7

65. The method of claim 63 wherein said index file is retained on said client computer and wherein said step of verifying said file system is executed on said client computer.
66. The method of claim 67 wherein said index file is compressed.
67. The method of claim 63 wherein files missing from said file system are retrieved from said server computer.
68. The method of claim 63 wherein said index file corresponds to said attributes of said client computer.
69. The method of claim 67 wherein said files are retrieved using the PXE TFTP protocol.
70. The method of claim 42 wherein said client computer comprises a registry file and wherein said step of managing said client computer comprises verifying said registry file of said client computer.
71. The method of claim 70 wherein said step of verifying said registry file comprises checking entries in said registry file against a registry index file.

Sub B'7

72. The method of claim 71 wherein said registry index file is retained on said server computer and wherein said step of verifying said registry file is executed on said server computer.
73. The method of claim 71 wherein said registry index file is retained on said client computer and wherein said step of verifying said registry file is executed on said client computer.
74. The method of claim 71 wherein said registry index file corresponds to said attributes of said client computer.
75. The method of claim 45 further comprising the step of mounting a remote volume of said server computer on said client computer.
76. The method of claim 75 wherein said step of executing said management instructions comprises accessing files stored on said remote volume.
77. The method of claim 76 wherein said client computer comprises a file system and wherein said step of managing said client computer comprises verifying said file system of said client computer.
78. The method of claim 77 wherein files missing from said file system are retrieved from said remote volume.

Sub B' 7

79. The method of claim 76 wherein said step of verifying said file system comprises checking the files in said file system against an index file.
80. A computer readable medium having instructions stored thereon for executing the method of claim 42.
81. A computer readable medium having instructions stored thereon for executing the method of claim 44.
82. A computer readable medium having instructions stored thereon for executing the method of claim 49.
83. A computer readable medium having instructions stored thereon for executing the method of claim 56.
84. A computer readable medium having instructions stored thereon for executing the method of claim 57.
85. A computer readable medium having instructions stored thereon for executing the method of claim 59.

Sub B<sup>7</sup>

86. A computer readable medium having instructions stored thereon for executing the method of claim 68.
87. A computer readable medium having instructions stored thereon for executing the method of claim 70.
88. A computer readable medium having instructions stored thereon for executing the method of claim 74.
89. A computer readable medium having instructions stored thereon for executing the method of claim 76.
90. A system for managing client computers over a network, the system comprising:  
a database configured to store records of information about said client computers;  
a server application configured to receive requests from said client computers via said network and to associate said requests with said records corresponding to said client computers; and  
a plurality of configuration scripts comprising instructions to be executed by said client computers, wherein said scripts are provided to said client computers via said network by said server application in response to said requests and in accordance with said records of information in said database.

10

Sub B<sup>c</sup> 7

91. The system of claim 90 wherein said database is a directory services application.
92. The system of claim 90 wherein said records of information comprise template objects associated with each of said client computers.
93. The system of claim 92 wherein said records of information further comprise event objects associated with said template objects, wherein said event objects are associated with said configuration scripts such that said instructions are provided to said client computers upon the occurrence of an event.
94. The system of claim 93 wherein said event comprises the booting of one of said client computers.
95. The system of claim 93 wherein said database is a directory services application.
96. The system of claim 95 wherein said directory services application is Netware Directory Services.
97. The system of claim 95 wherein said directory services application is Microsoft Active Directory.

Sub B 7  
98. The system of claim 90 wherein said records of information comprise attributes of said client computers.

99. The system of claim 98 wherein said attributes comprise DMI attributes.

100. The system of claim 98 wherein said attributes comprise PCI attributes.

101. The system of claim 98 wherein said attributes comprise SMBIOS attributes.

102. A system for managing client computers over a network, the system comprising:  
a directory services application configured to store objects associated with  
said client computers;  
a plurality of configuration scripts comprising instructions to be executed  
by said client computers;  
an interface configured to allow an administrator to select a script to be  
executed by one of said client computers upon the occurrence of  
an event; and  
a server application configured to provide said script to said client  
computer via said network in response to said occurrence of said  
event.

103. The system of claim 102 wherein said event is associated to said one of said  
client computers by a template object in said directory services application.



Sub 57

104. The system of claim 102 wherein at least two of said client computers are associated in said directory services application by a workstation group object.

105. A system for administering client computers over a network, the system comprising:

means for receiving boot messages from said client computers;

means for recognizing said client computers from said boot messages;

means for associating said boot messages with entries in a database to

determine administration steps to be performed on said client computers; and

means for providing said administrative steps to said client computers in response to said boot messages.

106. The system of claim 105 further comprising means for determining attributes of said client computers.

107. The system of claim 106 wherein said determining means comprises means for querying hardware and software attributes of said client computers.

108. The system of claim 107 wherein said querying means comprises means for querying DMI parameters of said client computers.

Sub B 7  
109. The system of claim 107 wherein said querying means comprises means for querying PCI parameters of said client computers.

110. The system of claim 107 wherein said querying means comprises means for querying SMBIOS parameters of said client computers.

111. A method of maintaining files on a client computer comprising the steps of:  
receiving a boot request at a server computer from said client computer;  
providing a response to said boot request from said server to said client,  
wherein said response comprises a file checking program  
configured to be executed on said client computer;  
receiving an index of files on said client computer from said file checking  
program;  
providing updated files from said server to said client computer based  
upon said index.

112. The method of claim 111 comprising the step of mounting a volume of said server to said client computer.

113. The method of claim 112 wherein said volume is mounted via a network stack located in a ROM on said client computer.

114. The method of claim 113 wherein said ROM is a ROM on a network interface card of said client computer.

115. The method of claim 114 wherein said ROM is a PXE-enabled ROM.

116. A method of maintaining a registry on a client computer comprising the steps of:

- receiving a boot request at a server computer from said client computer;
- providing a response to said boot request from said server to said client, wherein said response comprises a registry checking program configured to be executed on said client computer;
- receiving said registry program at said server from said registry checking program;
- verifying said registry at said server; and
- providing an updated registry from said server to said client computer.